

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Group Art Unit - Unknown

In re

Patent Application of

Vincent L. Chiang, et al.

Serial No.: Unknown

Filed: November _____, 2001

Examiner: Unknown

"METHOD FOR ENHANCING CELLULOSE AND
MODIFYING LIGNIN BIOSYNTHESIS IN PLANTS"

I, Leslie Lindsay, hereby certify that this correspondence is being deposited with the US Postal Service as "Express Mail" Post Office to Addressee," mailing Label Number EL35398691US, Box PCT, Commissioner for Patents, Washington, DC 20231, on the date of my signature.


Signature

11-19-01

Date of Signature

09/980043



SEQUENCE LISTING STATEMENT


Box PCT
Commissioner for Patents
Washington, DC 20231

Sir:

The Sequence Listing in this filing under 35 U.S.C. 371, is identical to the computer readable copy of the Sequence Listing in International Application No. PCT/US00/13637, filed May 18, 2000. In accordance with 37 CFR 1.821(e), please use the computer readable form filed in that application as the computer readable form for the instant application.

It is understood that the U.S. Patent and Trademark Office will make the necessary change in application number and filing date for the instant application. A paper copy of the Sequence Listing was included in the originally-filed specification in the instant application.

Respectfully submitted,


Sara D. Vinarov
Reg. No. 48,524

File No. 066040-9675

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Per/371



RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/980,043

DATE: 03/27/2002
TIME: 14:51:09

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1 <110> APPLICANT: Board of Control of Michigan Technological Univers
2 <120> TITLE OF INVENTION: METHOD FOR ENHANCING CELLULOSE AND MODIFYING LIGNIN
3   BIOSYNTHESIS IN PLANTS
4 <130> FILE REFERENCE: 66040/9675
5 <140> CURRENT APPLICATION NUMBER: 09/980,043
6 <141> CURRENT FILING DATE: 2001-11-19
7 <150> PRIOR APPLICATION NUMBER: PCT/US00/13637
8 <151> PRIOR FILING DATE: 2000-05-18
9 <150> PRIOR APPLICATION NUMBER: 60/135,280
10 <151> PRIOR FILING DATE: 1999-05-21
11 <160> NUMBER OF SEQ ID NOS: 6
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25           1               5               10
26   cag gtg ggg cat gat gca aat ggg gag cta ttt gtg gct tgc cat gag 158
27   Gln Val Gly His Asp Ala Asn Gly Glu Leu Phe Val Ala Cys His Glu
28       15               20               25               30
29   tgt agc tat ccc atg tgc aag tct tgt ttc gag ttt gaa atc aat gag 206
30   Cys Ser Tyr Pro Met Cys Lys Ser Cys Phe Glu Phe Glu Ile Asn Glu
31           35               40               45
32   ggc cgg aaa gtt tgc ttg cgg tgt ggc tgc cca tat gat gag aac ttg 254
33   Gly Arg Lys Val Cys Leu Arg Cys Gly Ser Pro Tyr Asp Glu Asn Leu
34           50               55               60
35   ctg gat gat gta gaa aag aag ggg tct ggc aat caa tcc aca atg gca 302
36   Leu Asp Asp Val Glu Lys Lys Gly Ser Gly Asn Gln Ser Thr Met Ala
37           65               70               75
38   tct cac ctc aac gat tct cag gat gtc gga atc cat gct aga cat atc 350
39   Ser His Leu Asn Asp Ser Gln Asp Val Gly Ile His Ala Arg His Ile
40       80               85               90
41   agt agt gtg tcc act gtg gat agt gaa atg aat gat gaa tat ggg aat 398
42   Ser Ser Val Ser Thr Val Asp Ser Glu Met Asn Asp Glu Tyr Gly Asn
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48	Lys Lys Lys Arg Ser Pro Lys Ala Glu Thr Glu Pro Ala Gln Val Pro	
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50	aca gaa cag cag atg gaa gag aaa ccg tct gca gag gct tcg gag ccg	542
51	Thr Glu Gln Gln Met Glu Glu Lys Pro Ser Ala Glu Ala Ser Glu Pro	
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53	ctt tca att gtt tat cca att cca cgc aac aag ctc aca cca tac aga	590
54	Leu Ser Ile Val Tyr Pro Ile Pro Arg Asn Lys Leu Thr Pro Tyr Arg	
55		160 165 170
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57	Ala Val Ile Ile Met Arg Leu Val Ile Leu Gly Leu Phe Phe His Phe	
58		175 180 185 190
59	aga ata aca aat cct gtc gat agt gcc ttt ggc ctg tgg ctt act tct	686
60	Arg Ile Thr Asn Pro Val Asp Ser Ala Phe Gly Leu Trp Leu Thr Ser	
61		195 200 205
62	gtc ata tgt gag atc tgg ttt gca ttt tct tgg gtg ttg gat cag ttc	734
63	Val Ile Cys Glu Ile Trp Phe Ala Phe Ser Trp Val Leu Asp Gln Phe	
64		210 215 220
65	ccc aag tgg aat cct gtc aat aga gaa acg tat atc gaa agg ctg tcg	782
66	Pro Lys Trp Asn Pro Val Asn Arg Glu Thr Tyr Ile Glu Arg Leu Ser	
67		225 230 235
68	gca agg tat gaa aga gag ggt gag cct tct cag ctt gct ggt gtg gat	830
69	Ala Arg Tyr Glu Arg Glu Gly Glu Pro Ser Gln Leu Ala Gly Val Asp	
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71	ttt ttc gtg agt act gtt gat ccg ctg aag gaa ccg cca ttg atc act	878
72	Phe Phe Val Ser Thr Val Asp Pro Leu Lys Glu Pro Pro Leu Ile Thr	
73		255 260 265 270
74	gcc aat aca gtc ctt tcc atc ctt gct gtg gac tat ccc gtc gat aaa	926
75	Ala Asn Thr Val Leu Ser Ile Leu Ala Val Asp Tyr Pro Val Asp Lys	
76		275 280 285
77	gtc tcc tgc tac gtg tct gat gat ggt gca gct atg ctt tca ttt gaa	974
78	Val Ser Cys Tyr Val Ser Asp Asp Gly Ala Ala Met Leu Ser Phe Glu	
79		290 295 300
80	tct ctt gta gaa aca gct gag ttt gca agg aag tgg gtt ccg ttc tgc	1022
81	Ser Leu Val Glu Thr Ala Glu Phe Ala Arg Lys Trp Val Pro Phe Cys	
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83	aaa aaa ttc tca att gaa cca aga gca ccg gag ttt tac ttc tca cag	1070
84	Lys Lys Phe Ser Ile Glu Pro Arg Ala Pro Glu Phe Tyr Phe Ser Gln	
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86	aaa att gat tac ttg aaa gac aag gtt caa cct tct ttc gtg aaa gaa	1118
87	Lys Ile Asp Tyr Leu Lys Asp Lys Val Gln Pro Ser Phe Val Lys Glu	
88		335 340 345 350
89	cgt aga gca atg aaa agg gat tat gaa gag tac aaa gtc cga gtt aat	1166
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91		355 360 365
92	gcc ctg gta gca aag gct cag aaa aca cct gaa gaa gga tgg act atg	1214
93	Ala Leu Val Ala Lys Ala Gln Lys Thr Pro Glu Glu Gly Trp Thr Met	

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96	Gln Asp Gly Thr Pro Trp Pro Gly Asn Asn Thr Arg Asp His Pro Gly							
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98	cat gat tca ggt ctt cct tgg gaa ata ctg gga gct cgt gac att gaa							1310
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101	gga aat gaa cta cct cgt cta gta tat gtc tcc agg gag aag aga cct							1358
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105	Gly Tyr Gln His His Lys Lys Ala Gly Ala Glu Asn Ala Leu Val Arg							
106			435		440		445	
107	gtg tct gca gta ctc aca aat gct ccc tac atc ctc aat gtt gat tgt							1454
108	Val Ser Ala Val Leu Thr Asn Ala Pro Tyr Ile Leu Asn Val Asp Cys							
109		450		455		460		
110	gat cac tat gta aac aat agc aag gct gtt cga gag gca atg tgc atc							1502
111	Asp His Tyr Val Asn Asn Ser Lys Ala Val Arg Glu Ala Met Cys Ile							
112		465		470		475		
113	ctg atg gac cca caa gta ggt cga gat gta tgc tat gtg cag ttc cct							1550
114	Leu Met Asp Pro Gln Val Gly Arg Asp Val Cys Tyr Val Gln Phe Pro							
115		480		485		490		
116	cag agg ttt gat ggc ata gat aag agt gat cgc tac gcc aat cgt aac							1598
117	Gln Arg Phe Asp Gly Ile Asp Lys Ser Asp Arg Tyr Ala Asn Arg Asn							
118		495		500		505		510
119	gta gtt ttc ttt gat gtt aac atg aaa ggg ttg gat ggc att caa gga							1646
120	Val Val Phe Phe Asp Val Asn Met Lys Gly Leu Asp Gly Ile Gln Gly							
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122	cca gta tac gta gga act ggt tgt gtt ttc aac agg caa gca ctt tac							1694
123	Pro Val Tyr Val Gly Thr Gly Cys Val Phe Asn Arg Gln Ala Leu Tyr							
124		530		535		540		
125	ggc tac ggg cct cct tct atg ccc agc tta cgc aag aga aag gat tct							1742
126	Gly Tyr Gly Pro Pro Ser Met Pro Ser Leu Arg Lys Arg Lys Asp Ser							
127		545		550		555		
128	tca tcc tgc ttc tca tgt tgc tgc ccc tca aag aag aag cct gct caa							1790
129	Ser Ser Cys Phe Ser Cys Cys Cys Pro Ser Lys Lys Lys Pro Ala Gln							
130		560		565		570		
131	gat cca gct gag gta tac aga gat gca aaa aga gag gat ctc aat gct							1838
132	Asp Pro Ala Glu Val Tyr Arg Asp Ala Lys Arg Glu Asp Leu Asn Ala							
133		575		580		585		590
134	gcc ata ttt aat ctt aca gag att gat aat tat gac gag cat gaa agg							1886
135	Ala Ile Phe Asn Leu Thr Glu Ile Asp Asn Tyr Asp Glu His Glu Arg							
136			595		600		605	
137	tca atg ctg atc tcc cag ttg agc ttt gag aaa act ttt ggc tta tct							1934
138	Ser Met Leu Ile Ser Gln Leu Ser Phe Glu Lys Thr Phe Gly Leu Ser							
139		610		615		620		
140	tct gtc ttc att gag tct aca cta atg gag aat gga gga gta ccc gag							1982
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146	tgt ggc tat gaa gag aag act gaa tgg gga aaa cag att ggt tgg ata	2078
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148	655 660 665 670	
149	tat ggg tca gtc act gag gat atc tta agt ggc ttc aag atg cac tgc	2126
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151	675 680 685	
152	cga gga tgg aga tca att tac tgc atg ccc gta agg cct gca ttc aaa	2174
153	Arg Gly Trp Arg Ser Ile Tyr Cys Met Pro Val Arg Pro Ala Phe Lys	
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158	tgg gct ctt ggt tct gtg gaa att ttc ttt agc aga cac tgt ccc ctc	2270
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162	Trp Tyr Gly Phe Gly Gly Arg Leu Lys Trp Leu Gln Arg Leu Ala	
163	735 740 745 750	
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166	755 760 765	
167	tat tgc aca att cct gca gtt tgt ctg ctc acc gga aaa ttc atc ata	2414
168	Tyr Cys Thr Ile Pro Ala Val Cys Leu Leu Thr Gly Lys Phe Ile Ile	
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173	tcc atc att gta act gcg gtg ctt gag cta aga tgg agc ggt gtc agc	2510
174	Ser Ile Ile Val Thr Ala Val Leu Glu Leu Arg Trp Ser Gly Val Ser	
175	800 805 810	
176	att gaa gat tta tgg cgt aat gaa caa ttc tgg gtg atc gga ggt gtt	2558
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178	815 820 825 830	
179	tca gcc cat ctc ttt gcg gtc ttc cag gga ttc tta aaa atg ttg gct	2606
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183	Gly Ile Asp Thr Asn Phe Thr Val Thr Ala Lys Ala Ala Glu Asp Ala	
184	850 855 860	
185	gaa ttt ggg gag cta tat atg gtc aag tgg aca aca ctt ttg att cct	2702
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197   ggt cta atg ggt cgc caa aac cta aca cca acc att gtt gtt ctc tgg      2894
198   Gly Leu Met Gly Arg Gln Asn Leu Thr Pro Thr Ile Val Val Leu Trp
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204   Pro Phe Val Asn Lys Val Asp Asn Thr Leu Val Ala Glu Thr Cys Ile
205                               960                               965                               970
206   tcc att gat tgc tgagctacct ccaataagtc tctcccgagta ttttgggggtt      3042
207   Ser Ile Asp Cys
208   975
209   acaaaacctt tgggaattgg aatatgatcc tcgttgtagt ttccctcaag aaagcacata 3102
210   tcgctgtcag tatttaaatg aactgcaaga tgattgttct ctatgaagtt ttgaacagtt 3162
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222                               20                               25                               30
223   Tyr Pro Met Cys Lys Ser Cys Phe Glu Phe Glu Ile Asn Glu Gly Arg
224   35                               40                               45
225   Lys Val Cys Leu Arg Cys Gly Ser Pro Tyr Asp Glu Asn Leu Leu Asp
226   50                               55                               60
227   Asp Val Glu Lys Lys Gly Ser Gly Asn Gln Ser Thr Met Ala Ser His
228   65                               70                               75                               80
229   Leu Asn Asp Ser Gln Asp Val Gly Ile His Ala Arg His Ile Ser Ser
230                               85                               90                               95
231   Val Ser Thr Val Asp Ser Glu Met Asn Asp Glu Tyr Gly Asn Pro Ile
232   100                               105                               110
233   Trp Lys Asn Arg Val Lys Ser Cys Lys Asp Lys Glu Asn Lys Lys Lys
234   115                               120                               125
235   Lys Arg Ser Pro Lys Ala Glu Thr Glu Pro Ala Gln Val Pro Thr Glu
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238   145                               150                               155                               160
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